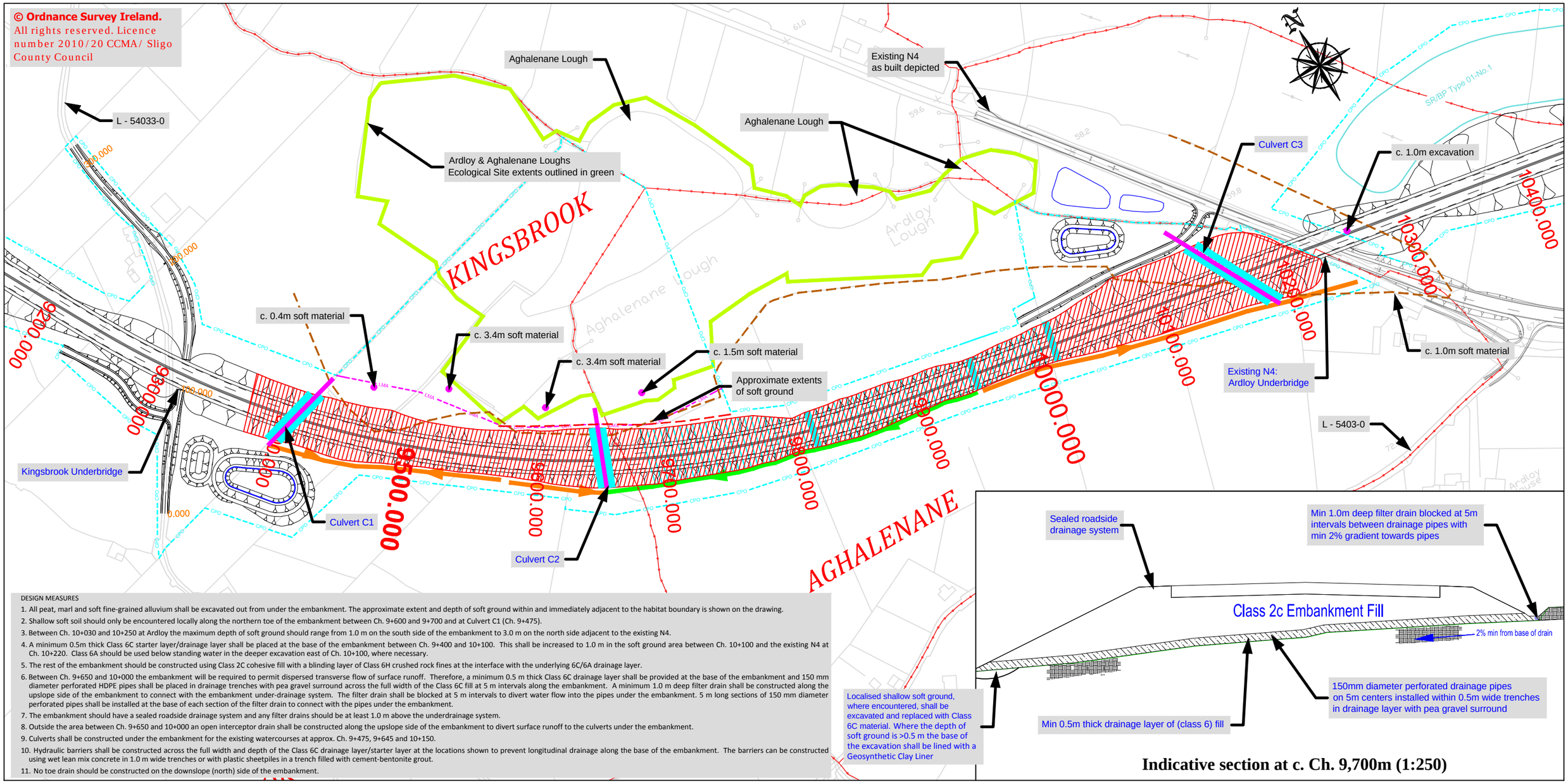


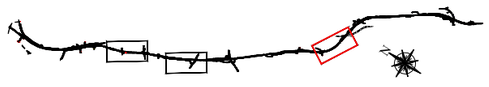
DESIGN MEASURES

1. All peat, marl and soft fine-grained alluvium shall be excavated out from under the embankment. The approximate extent and depth of soft ground within and immediately adjacent to the habitat boundary is shown on the drawing.
2. Shallow soft soil should only be encountered locally along the northern toe of the embankment between Ch. 9+600 and 9+700 and at Culvert C1 (Ch. 9+475).
3. Between Ch. 10+030 and 10+250 at Ardloy the maximum depth of soft ground should range from 1.0 m on the south side of the embankment to 3.0 m on the north side adjacent to the existing N4.
4. A minimum 0.5m thick Class 6C starter layer/drainage layer shall be placed at the base of the embankment between Ch. 9+400 and 10+100. This shall be increased to 1.0 m in the soft ground area between Ch. 10+100 and the existing N4 at Ch. 10+220. Class 6A should be used below standing water in the deeper excavation east of Ch. 10+100, where necessary.
5. The rest of the embankment should be constructed using Class 2C cohesive fill with a blinding layer of Class 6H crushed rock fines at the interface with the underlying 6C/6A drainage layer.
6. Between Ch. 9+650 and 10+000 the embankment will be required to permit dispersed transverse flow of surface runoff. Therefore, a minimum 0.5 m thick Class 6C drainage layer shall be provided at the base of the embankment and 150 mm diameter perforated HDPE pipes shall be placed in drainage trenches with pea gravel surround across the full width of the Class 6C fill at 5 m intervals along the embankment. A minimum 1.0 m deep filter drain shall be constructed along the upslope side of the embankment to connect with the embankment under-drainage system. The filter drain shall be blocked at 5 m intervals to divert water flow into the pipes under the embankment. 5 m long sections of 150 mm diameter perforated pipes shall be installed at the base of each section of the filter drain to connect with the pipes under the embankment.
7. The embankment should have a sealed roadside drainage system and any filter drains should be at least 1.0 m above the underdrainage system.
8. Outside the area between Ch. 9+650 and 10+000 an open interceptor drain shall be constructed along the upslope side of the embankment to divert surface runoff to the culverts under the embankment.
9. Culverts shall be constructed under the embankment for the existing watercourses at approx. Ch. 9+475, 9+645 and 10+150.
10. Hydraulic barriers shall be constructed across the full width and depth of the Class 6C drainage layer/starter layer at the locations shown to prevent longitudinal drainage along the base of the embankment. The barriers can be constructed using wet lean mix concrete in 1.0 m wide trenches or with plastic sheetpiles in a trench filled with cement-bentonite grout.
11. No toe drain should be constructed on the downslope (north) side of the embankment.

Indicative section at c. Ch. 9,700m (1:250)

Legend

- Drainage layer at base of embankment;
- Perforated drainage pipes;
- Limits of LMA where required;
- Filter drain blocked at 5m centers to distribute flow laterally;
- Existing surface water flow;
- Proposed Open Drain;
- Proposed Culvert;
- Hydraulic Barrier;
- Approx. extent of PEAT/MARL;
- Townland Boundary;
- CPO Boundary;
- Land Made Available (LMA);
- Townland Names;
- Design Chainage;
- Constructed Wetland;
- Existing Attenuation Pond;
- Spoil Repository/ Borrow Pit;



NOTE:
All proposed road levels indicated are based on a Design prepared for Phase 3 and 4 of the NRA PMG and may be revised at the Detailed Design Stage.
Modifications may be made to avail of oppurtunities to improve the design in the light of experience on the ground or other innovations provided this has no significant adverse environmental effects.

An Roinn Iompair Turasóireachta agus Spóirt
Department of Transport, Tourism and Sport

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Date	By	Revision

Project: N4 Collooney to Castlebaldwin *Proposed Road Development*

Title: Specific Design Mitigation: Ardloy & Aghalenane Loughs

Scales (@A3)	Date	Job No.	Figure No.:
1:3,000	December 2013	SO/01/150	Fig.: 4.8.3
Design: AGL Ltd.	Design Team Review: FM	Approved: AS	